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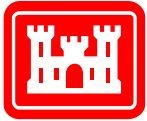
The Army Meter Data Management System (MDMS)

A Case Study For Army MDMS Pilot

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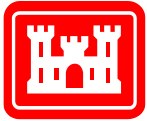
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MDMS Serves the Army in Meeting Energy Goals

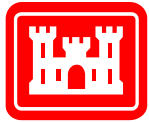
- MDMS will help the Army to comply with Federal Mandates
 - Energy Policy Act of 2005 (EPAAct 2005)
 - Energy Independence and Security Act of 2007 (EISA 2007)
 - Other Executive Orders
 - Army Programs Like Net Zero and LEED Silver



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What is MDMS?

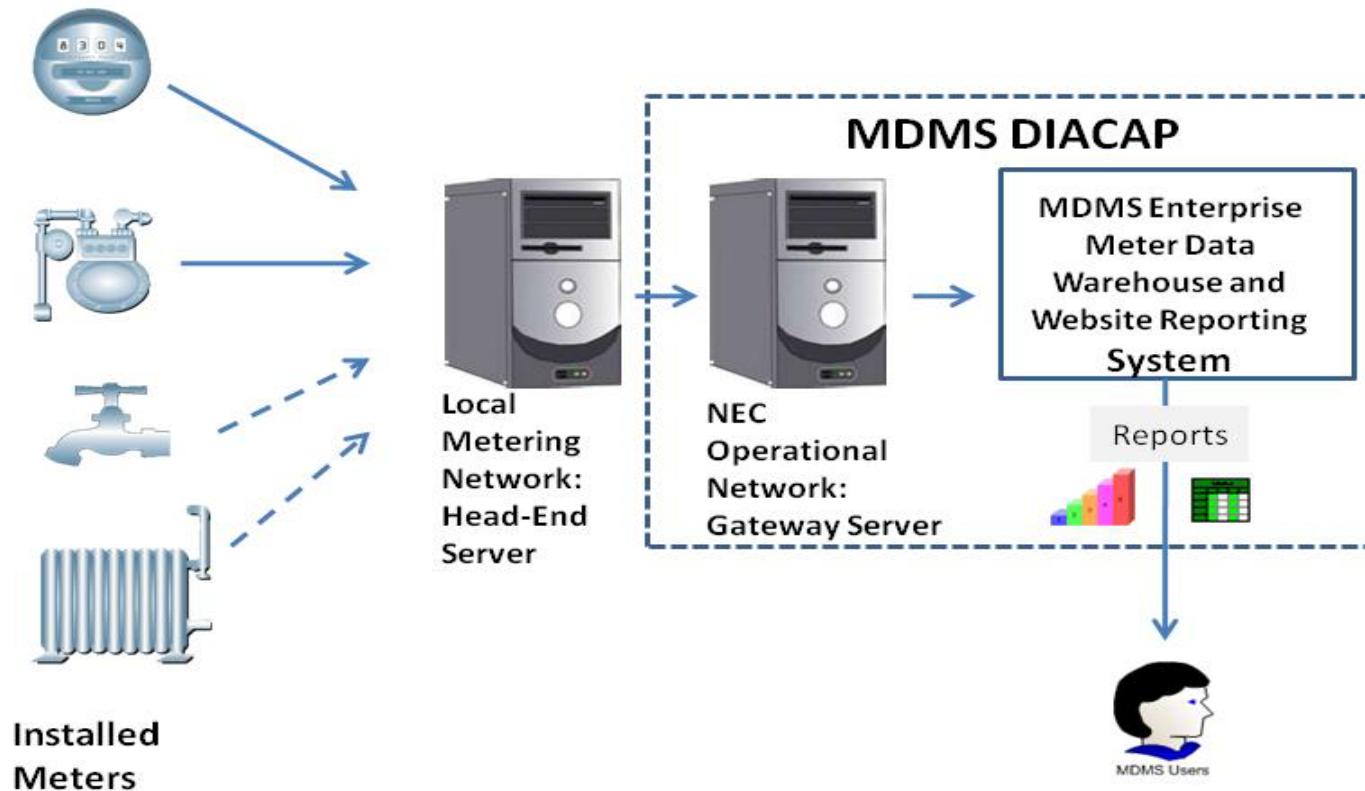
- An enterprise system to track the Army's energy and water consumption worldwide
 - Tracks meter data from advanced utility meters in a central database (MDMS Enterprise)
 - Automates meter data collection on a secure network
 - Produces energy reports accessible via Army Engineering Knowledge Online (EKO) and MDMS Enterprise Portal
- Provides Army installations the ability to track utility commodities consumption at the facility level

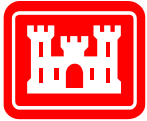


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What is being installed?

- Meter Data Management System (MDMS)
 - Gateway communicates to the head end server

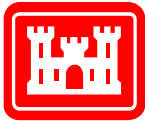




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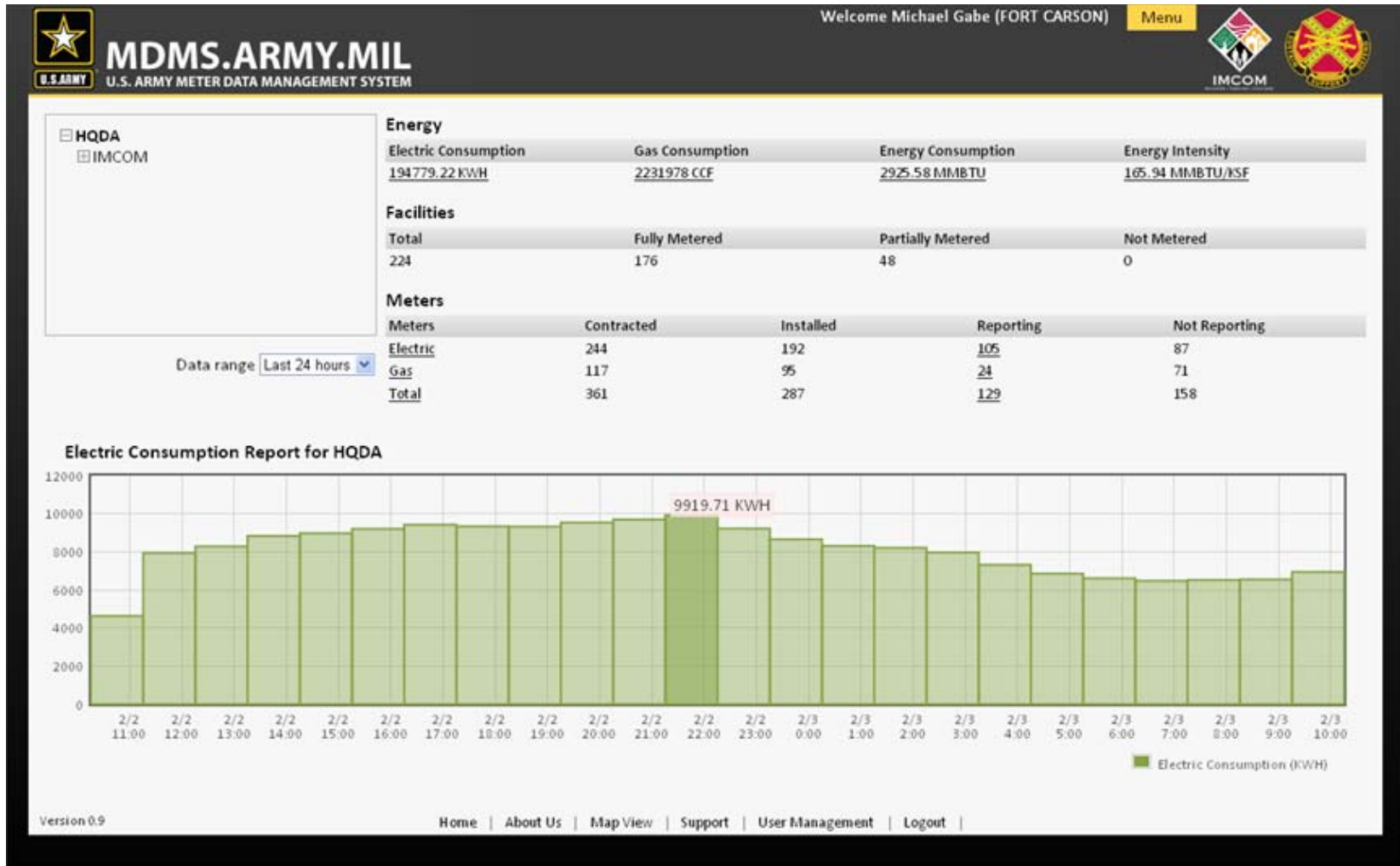
MDMS Background

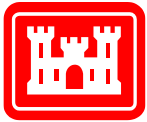
- Three locations have active meter reporting- over 195 meters as of 1 May 2011
 - Fort Carson
 - Fort Stewart
 - US Military Academy (West Point, NY)
- Meets DoD cyber-security requirements
 - Received Authority to Operate from Army NETCOM effective 23 April 2010
 - Received Certificate of Networthiness from Army NETCOM on 26 July 2010
- Over 195 meters reporting at 3 sites (05/01/11)



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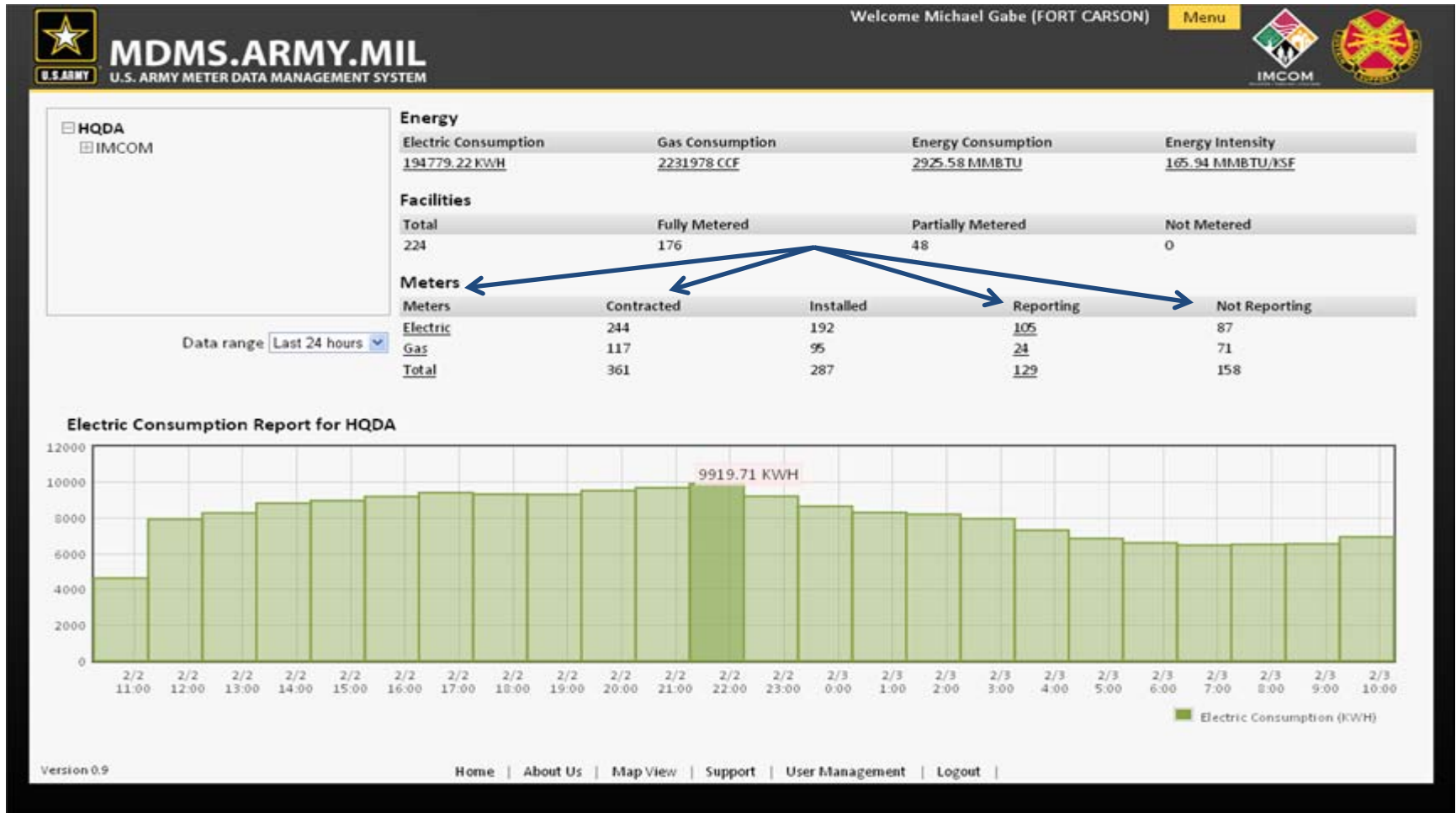
System Default View

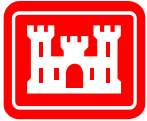




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System Output, Meter Status



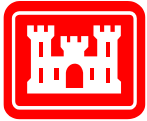


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MDMS

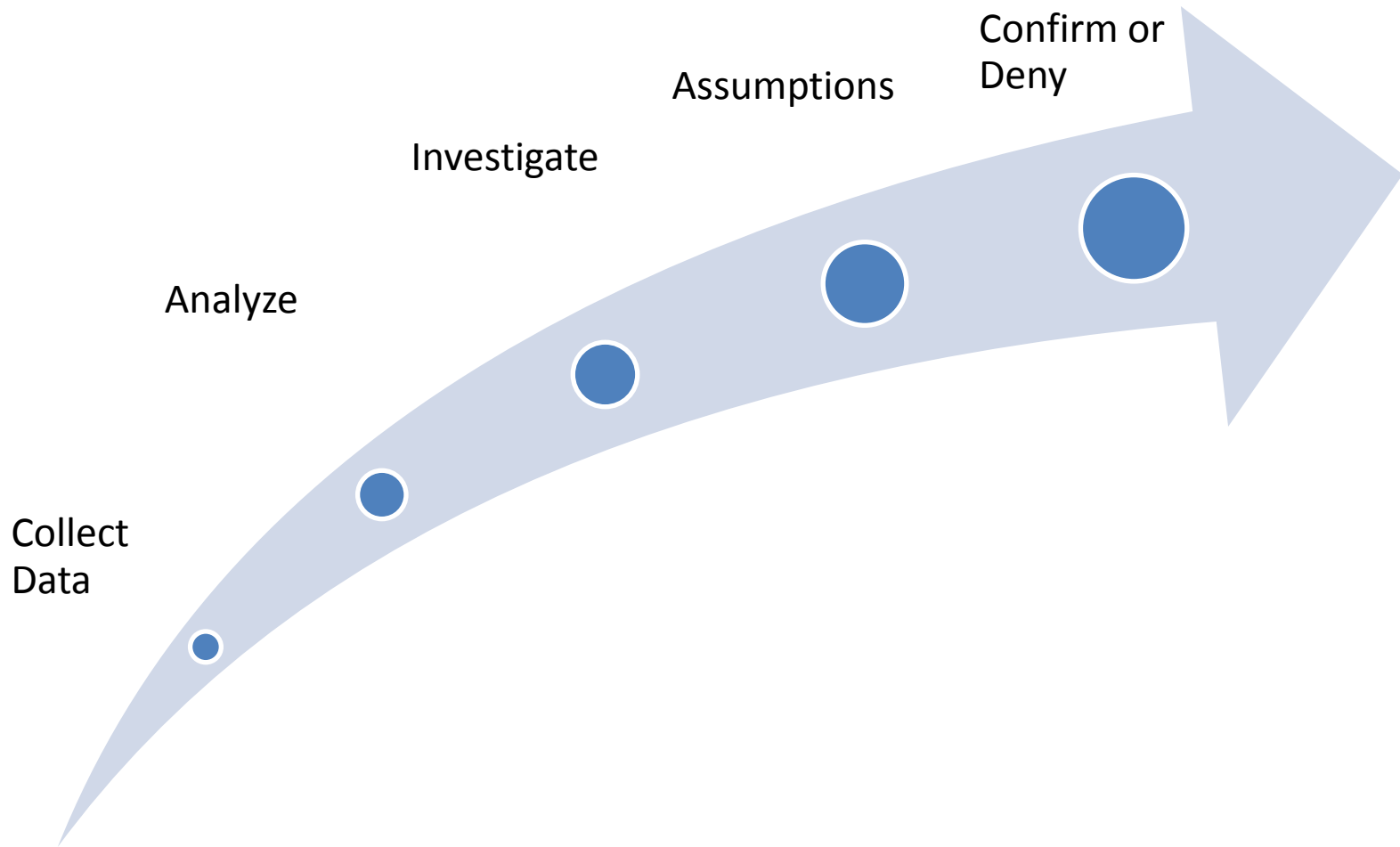
Results of Pilot

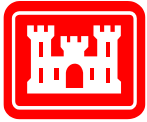
- Authority to Operate on DoD network
 - Received ATO from Army NETCOM effective 23 April 2010
 - Received CoN from Army NETCOM on 26 July 2010
- Over 195 meters reporting at 3 sites (05/01/11)
 - 16 Electric , 0 NG Fort Stewart
 - 73 Electric, 18 NG Fort Carson
 - 56 Electric, 32 NG West Point



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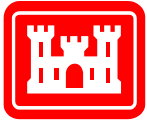
MDMS Process





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Case Study (Typical)



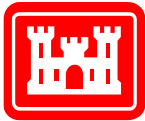
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Case Study

The MDMS collected meter data from a single building.

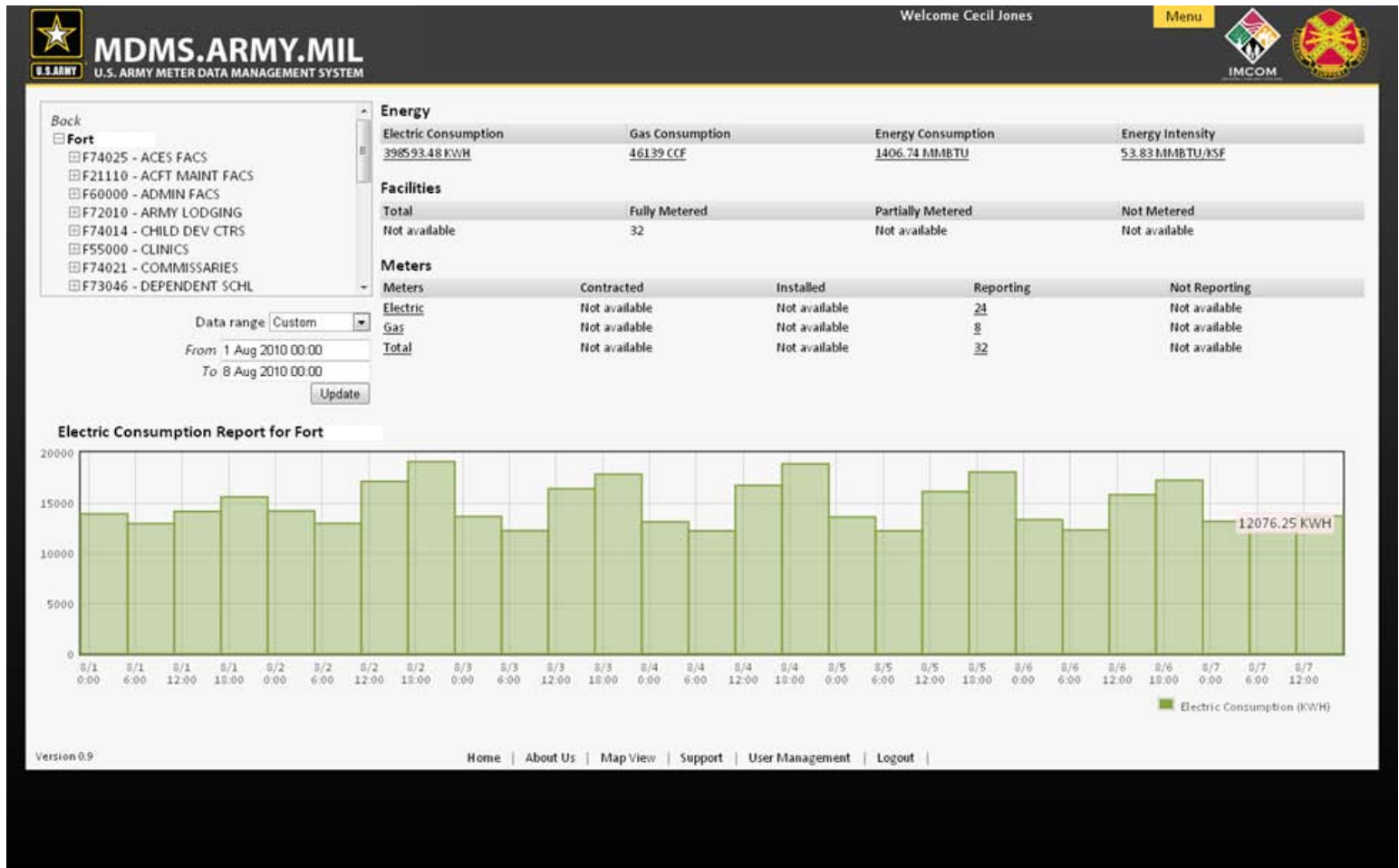
The data collected:

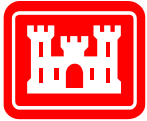
15-minute incremental electric (kWh) consumption data
672 discrete data elements (every 15 minutes for 7 days)
One full week (Sunday to Saturday)
August 1 through August 7, 2010



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Initial Data from MDMS





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Demand Analysis

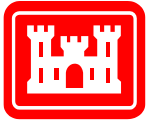
Consistent levels of consumption, day and night



Daytime average of 50 kWh every 15 minutes $\approx 200\text{kW}$

Nighttime average of 30 kWh every 15 minutes $\approx 120\text{kW}$

Δ is $\approx 80\text{kW}$

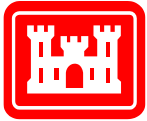


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Clue: The Energy Delta

80	kW delta
80	hours/wk
52	weeks/year
332,800	kWh per year
61,595	SF
5.40	kWh/SF/year

5.4 kWh/SF/year is approximately half a typical lighting load, but typical if one third to half of the total SF is storage...

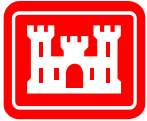


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Energy Conservation Measures

Based on MDMS data and analysis, this facility is a potential candidate for:

- Daylight harvesting
- Lighting automation
- Nighttime setbacks of other building systems, particularly air handling units (AHUs)

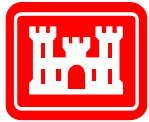


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Confirmation

During a site visit, we were able to confirm:

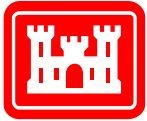
- The facility is not connected to the energy management system (neither heating or air conditioning systems are being set back at night);
- Lighting is manually controlled and is turned on at the beginning of the shift and off at the end of the shift; and
- The building is a single story, flat-roof building: ideal for solar and daylight harvesting.



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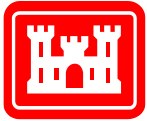
Solar and Daylight Harvesting (Typical Project)

kWh per year for lighting						
	Reduction Percentages for Various Light Harvesting Projects					
Based on 332,800 kWh per year total for lighting	20%	30%	40%	50%	60%	70%
Annual kWh Savings	66,560	99,840	133,120	166,400	199,680	232,960
Approximate Square Feet of Solar Panels offset*	1,481	2,222	2,963	3,704	4,444	5,185
*Kyocera multi-crystalline 120w panels @ 12W/SF max and 90% grid tie conversion efficiency						
Solar Panel Calculation	120 watt panel					
X	80 hours per week					
X	52 weeks					
Equals	499.2 kWh per year gross					
X .90	449.28 kWh per year net					
Per	10 SF per panel					
Potential Harvest	44.928 kWh per year per SF					



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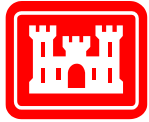
MDMS Plans for Rollout



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MDMS Plans

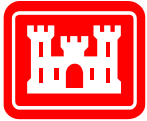
- Roll out to 40 additional installations and update current 3 by 1 October 2011
- Upgrade interoperability to allow for additional data point capture
- Integrate real property data
- Support tenant billing
- Establish help desk and training
- Upgrade reporting module to include more functionality and report flexibility
- Support Army Net Zero goals



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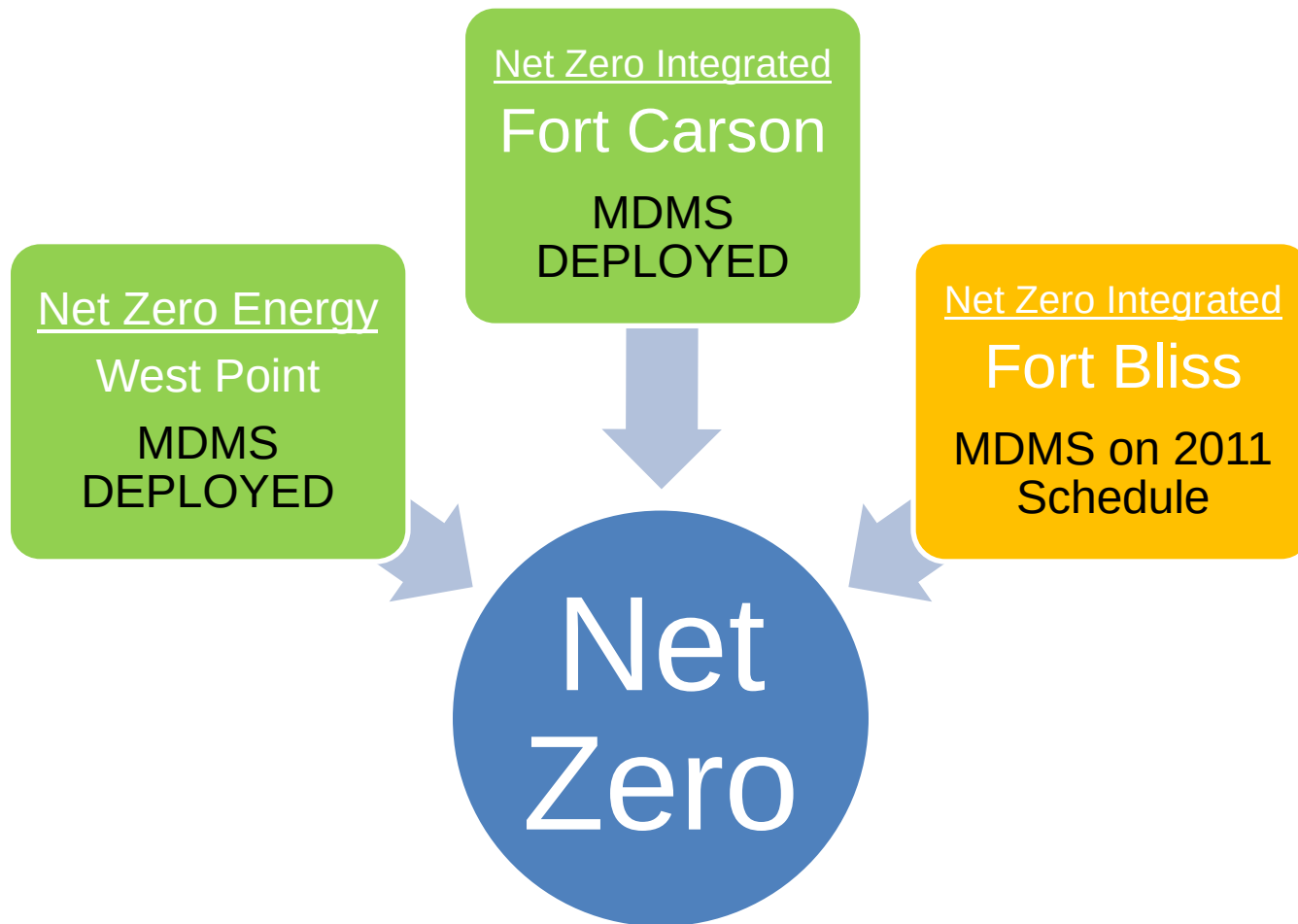
The Army path to Net Zero Energy

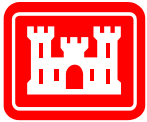
1. Reduce consumption
2. Repurpose inefficient usage
3. Deploy renewable on site generation



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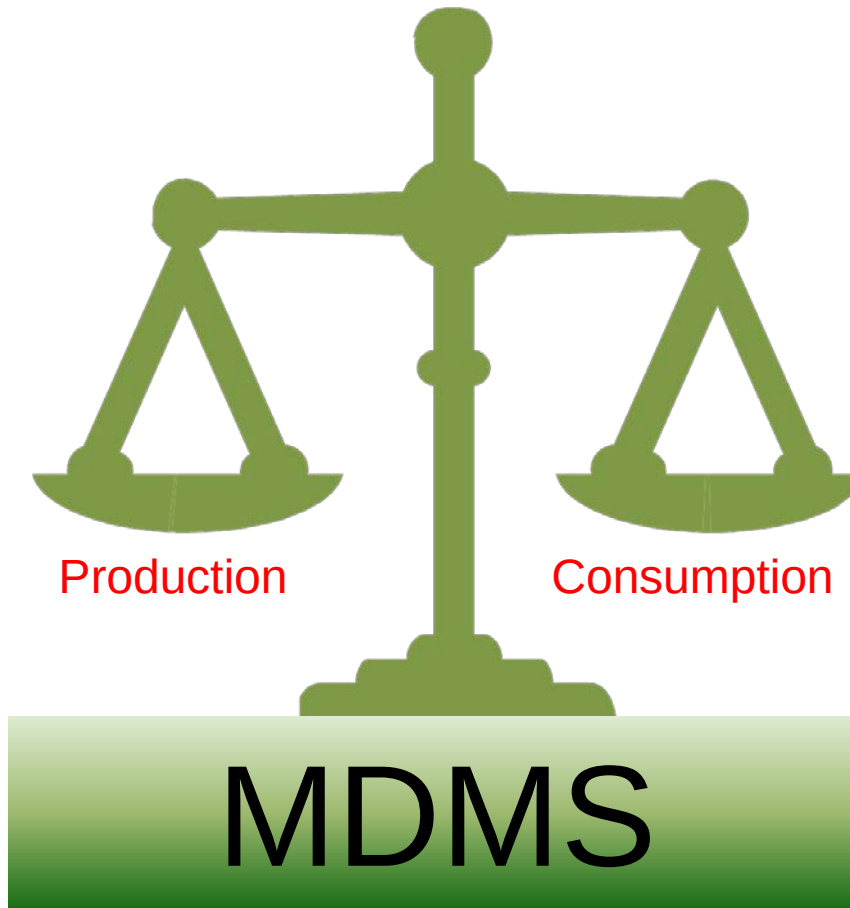
Leverage MDMS at Existing Sites

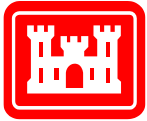




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Visualize Net Zero Balance



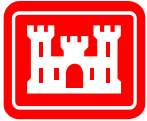


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MDMS

Roll-out Challenges

- DIACAP/ATO
 - Must have top level buy-in and agreements
 - UMCS and Meter networks offer a new challenge
- Interoperability with meters/head-end servers
 - Variability in equipment, software, configurations and installers
- Sustainability planning
 - “After the contract period ends, who will maintain software, servers, and other equipment?”



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Army MDMS Contacts

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